wherein the stack of layers of semiconductor materials furthermore comprises a transfer barrier layer, and an electron storage layer separated from the quantum well by the transfer barrier layer, and

wherein a thickness of the transfer barrier layer is at least one order of magnitude greater than a thickness of the quantum well, a lowest energy level of a conduction band of the transfer barrier layer is greater than energy levels of the quantum well and the electron storage layer, and the conduction band profile of the stack of layers of semiconductor materials decreases from the quantum well to the electron storage layer so as to further a flow of electrons from the second energy level to the electron storage layer.

13. (Amended) An electromagnetic wave detector comprising:

a stack of layers made of III-V semiconductor materials, a conduction band profile of said materials defining at least one quantum well, said quantum well having at least one first discrete energy level populated with electrons that are capable of passing to a second energy level under an absorption of an electromagnetic wave; and

a counting unit configured to count said electrons in the second energy level,

wherein the stack of layers of semiconductor materials furthermore comprises a transfer barrier layer, and an electron storage layer separated from the quantum well by the transfer barrier layer, and

wherein a thickness of the transfer barrier layer is at least one order of magnitude greater than a thickness of the quantum well, a lowest energy level of a conduction band of the transfer barrier layer is greater than energy levels of the quantum well and the electron storage layer, and the conduction band profile of the stack of layers of semiconductor materials decreases from the quantum well to the electron storage layer so as to further a flow of electrons from the second energy level to the electron storage layer.